Real-time Adherence Patterns in Persons Starting Oral Antiretrovirals Support Baseline Management of Depression, Methamphetamine Use, Homelessness and Real-time Adherence Interventions

S. Browne[1], A. Umlauf[2], T. Katsivas[1], T. Blaschke[3], F. Vaida[4], C. Benson[1], J. Caperna[1]

[1]University of California, San Diego, Medicine, La Jolla, United States, [2]University of California, San Diego, Psychiatry, La Jolla, United States, [3]Stanford, Medicine, Palo Alto, United States, [4]University of California, San Diego, Biostatistics, La Jolla, United States

<u>General</u>
Category: B2: Diagnostic and monitoring tools
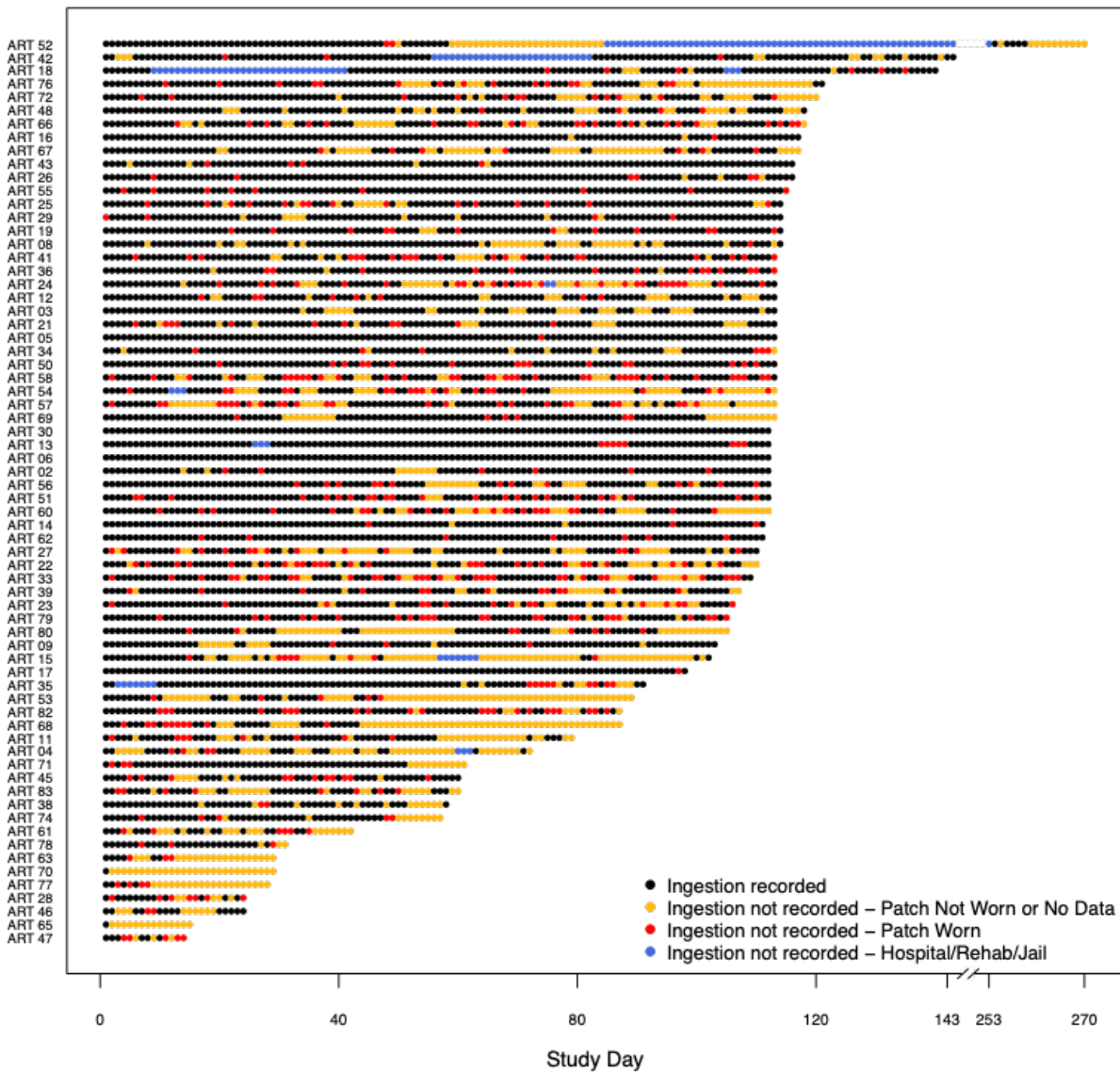**Country of research**: United States
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<u>Abstract Text (max 350 words)</u>
Background: Early identification of persons starting oral antiretroviral (ARV) treatment who need personalized support is limited. We captured real-time daily adherence in persons starting ARVs, analyzing dosing patterns and their associations with detailed baseline characteristics.
Methods: The real-time adherence behavior pattern was captured using FDA-approved digital-health-feedback system (DHFS) with ingestible-sensor-enabled ARVs in persons starting oral ARVs for 16 weeks. Baseline demographics, urine toxicology and self-report questionnaires were obtained. Kaplan-Meier Estimate evaluated persistence on study. Dot-plot captured individual patterns of daily medication taking; Spearman's rho and permutation tests analyzed dose taking patterns. Mixed-effects logistic regression, with multiple imputation, modeled characteristics associated with treatment adherence.
Results: Sixty-eight participants, 83.8% male, average age 38.8 years, 64.7% White, 23.5% Black race, 36.8% Hispanic ethnicity, were followed for 112 days median (14 -270) generating 6634 observation days. Persistence on study (surrogate for retention in care) for 16 weeks was 48.5%, with methamphetamine use (HR=2.48; CI$_{95}$ 1.21, 5.07; p=0.015), depression PHQ-8 (HR=1.08; CI $_{95}$ 1.01, 1.15; p=0.020) and greater life chaos (HR=1.12; CI $_{95}$ 1.05, 1.21; p=0.002) predictors of early dropout. Figure 1 shows dot-plot of individual participant daily medication taking patterns (legend insert provides color code). Missed doses occurred on consecutive days, mean 1.36 days, p<0.001. The likelihood of daily confirmed doses was higher in the absence of baseline depression, methamphetamine use and homelessness (see Table 1).

Table 1: Factors associated with daily confirmed doses, longitudinal mixed-effects logistic regression. Subject-specific odds ratios (ORs) and 95% confidence intervals (CI$_{95}$) reported. Results with p<0.04 are in bold.	Single-predictor model	Multi-predictor model with backward model selection, p<0.15

	Odds ratio (CI$_{95}$)	P-value	Odds ratio (CI$_{95}$)	P-value
Time on study, per 1 week	**0.896 (0.884, 0.908)**	**< 0.001**	**0.896 (0.884, 0.908)**	**<0.001**
Housing: Unhoused (ref) Vs Stable	**3.613 (1.680, 7.770)**	**0.001**	**2.107 (1.089, 4.077)**	**0.027**
English Basic (ref) vs Advanced	**2.901 (1.378, 6.107)**	**0.005**	**1.884 (1.030, 3.448)**	0.040
Medical insurance No (ref) vs Yes	**3.407 (1.398, 8.302)**	**0.007**	**2.355 (1.158, 4.790)**	**0.018**
UTOX Methamphetamine Pos (ref) vs Neg	**4.926 (2.349, 10.33)**	**<0.001**	**2.041 (1.039, 4.009)**	**0.038**
Questionnaires: PHQ-8, per 1 score	**0.873 (0.811, 0.939)**	**<0.001**	**0.913 (0.856, 0.973)**	**0.005**
Life chaos, per 1 score	**0.846 (0.791, 0.906)**	**<0.001**	---	

PHQ-8=Patient Health Questionnaire (8-items).

Conclusions: Real-time adherence patterns in persons starting oral ARV treatment verified missed doses occurred on consecutive days supporting real-time adherence interventions, and confirmed baseline methamphetamine use, depression and homelessness impact adherence early in treatment.